

Prof. Howes then pointed to the interesting fact that the ophthalmite had assumed more nearly the characters of the antenna than those of the more modified antennule, and concluded by saying that while in his opinion the specimen did not finally settle the morphology of the eye-stalk, he had nevertheless brought the drawing forward in the hope that study of it might curb the eagerness with which, in our craving for novelty, we were sometimes too ready to reject the older interpretation.

A paper was read by Mr. W. F. Kirby, F.E.S., entitled "A Revision of the Subfamily *Libellulinae*, with descriptions of new Genera and Species."

Mr. Kirby stated that the last compendium of this group had been published by Dr. Brauer in 1868, in which 40 genera were admitted. This number was now raised to 88. All of these were fully characterized in the present paper, in which 52 new species were also described. Mr. Kirby likewise gave a short sketch of the characters of the *Libellulinae*, and especially of the neururation of this group, which he considered to be of primary importance.

This paper will be published entire in the Society's 'Transactions.'

The following papers were read :—

1. Notes on Specimens in the Hume Collection of Birds.
—No. 5*. On *Syrnium maingayi*. By R. BOWDLER SHARPE, F.Z.S.

[Received April 15, 1887.]

This is a perfectly good species, and was described by Mr. Hume in the sixth volume of 'Stray Feathers' (p. 27). At the time of writing the 'Catalogue of Birds' I had seen but one specimen, collected by Dr. Maingay, in Lord Tweeddale's Museum, and I came to the conclusion that it was not to be separated from *Syrnium indrani* of Southern India and Ceylon. Since the advent of the Hume Collection to the British Museum, with its increased series of these Wood-Owls, I have come to the conclusion that the Malaccan species is distinct, and in fact that it is the best characterized of any of the *Bulaca* group.

1. SYRNIUM MAINGAYI.

Syrnium indrani, pt., Sharpe, Cat. B. ii. p. 282.

Syrnium maingayi, Hume, Str. F. vi. p. 27 (1878); id. Str. F. 1879, p. 46.

Adult (type of species). General colour above warm chocolate-brown, more or less distinctly barred across with rufous-buff cross markings, predominating on the hind neck and forming a tolerably

¹ For No. 4, see P. Z. S. 1886, p. 354.

distinct collar ; scapulars with slightly indicated whitish shaft-lines, several of them white externally, narrowly barred with rufous-brown ; lesser wing-coverts uniform chocolate-brown ; median and greater coverts rufous-brown, with reddish-buff cross bars, the ends slightly vermiculated with dusky dots ; bastard-wing and primary-coverts nearly uniform blackish, with slight indications of rufous-brown bars near the ends ; quills dark chocolate-brown, regularly barred with rufous-brown, paler on the outer web of the primaries ; upper tail-coverts chocolate-brown, numerously barred with reddish-brown cross bands, whitish on some of them ; tail-feathers brown, crossed with well-marked bars of fulvous, ten in number on the centre feathers and twelve on the outside ones ; crown of head and hind neck uniform chocolate-brown ; lores black, as well as the feathers around the eye, surmounted by an eyebrow of rufous, impinging on the forehead ; ear-coverts and cheeks chestnut-rufous, slightly fulvescent on the lower parts of the latter ; the whole of the rufous face surrounded by a chocolate-brown ruff, joined to the chin, which is chocolate-brown also, followed by a band of white across the lower throat ; fore neck and remainder of under surface of body tawny buff, regularly and narrowly barred with dark brown, some feathers with intermediate white spaces instead of buff ; thighs obscure brown ; under tail-coverts buffy white, with narrow brown cross bars ; under wing-coverts and axillaries rather deeper buff than the breast, barred with darker brown ; a patch of dark brown near the edge of the wing on the outer greater coverts ; quills below dark brown, barred with tawny buff, broader on the inner web. Total length 21 inches, wing 14·3, tail 8·4.

Both Captain Pinwill's specimens are more uniform on the mantle than the type, and one of these shows indications of uniformity on the chest, as is usual with *S. newarense* when it gets very old. The wing in both examples is 13·1 inches.

Hab. Neighbourhood of Malacca.

<i>a.</i> Ad. sk.	Malacca, July 1877	Hume Collection.
	(<i>W. Davison</i>).	(Type of species.)
<i>b, c.</i> Ad. sk.	Malacca.	Capt. Stackhouse
		Pinwill [P.].

I also give a list of the specimens of *Syrnium newarense* and *S. indrani* now in the Museum, with remarks on and measurements of each individual specimen, showing how difficult it is to draw the line between these two species, notwithstanding that the typical forms of each are well characterized and distinct from each other.

2. SYRNIUM NEWARENSE.

Syrnium newarense, Hodgs. Icon. ined. Accipitres, pl. 34 (no. 59) ; Sharpe, Cat. B. ii. p. 281 (1875) ; Hume, Str. F. 1879, p. 83 ; Scully, *t. c.* p. 229.

Bulaca newarensis, David & Oust. Ois. Chine, p. 46 (1877) ; Blauf. Str. F. 1877, p. 483.

Syrnium indranee, Blyth, B. Burm. p. 67 (1875) ; Walden, Ibis,

1876, p. 342; Hume & Davison, Str. F. vi. p. 27 (1878); Scully, Str. F. 1879, p. 229; Oates, B. Brit. Burm. ii. p. 164 (1883); Marshall, Ibis, 1884, p. 407.

Syrnium hodgsoni, Scully, Str. F. 1879, p. 231.

It is most difficult, if not impossible, to state the exact limits of size in the sexes of this species, for carefully-sexed males in the Hume collection measure from 13·7 inches to 15·5 inches, and the females from 15 inches to 16·6 inches. Dr. Scully procured a male (and there is no reason to doubt the determination of this careful observer) with the wing 15·7. One specimen has the wing 13·3, and this would doubtless be a male. On the other hand, a specimen with the sex undetermined has the wing 14·8 inches, and this might be either a very small female (the smallest in the Himalayan series having the wing 15 inches) or an ordinary male. In any case the measurements of the sexes overlap, and large males measure more than small females. To the eastward the species diminishes in size perceptibly, and the colour of the face is more permanently ochreous. The males have the wing 14 inches, and the females 14–14·5, which is a decidedly smaller average than with the series from the Himalayas.

In the Nilghiris the measurements are still smaller; the males have the wing 12·8 inches, and the females 13·0–13·9 inches. The Nuwara-Eliya skins are of about the same dimensions, but the ochre-faced skin from Kandy has the wing 11·9.

The tendency in eastern birds, first seen to any extent in some Nepal specimens, to be more fulvous underneath, is developed to a greater extent in specimens from Shillong, all of which are fulvescent below, but no generalization from this fact can be arrived at, as the Bussahir example matches one of the Shillong birds. It can therefore only be said that, as with the case of many other birds, there is a slight tendency to paler coloration in the specimens from the North-western Himalayas.

Accompanying the ochreous tint on the underparts there is generally a slight increase in the fulvous tinge on the face, which becomes more or less washed with ochreous buff. It never, however, becomes uniform, but is always more or less barred with dusky, showing at the same time a distinct approach to *S. indrani*. I have below referred to the specimen from Coonoor which has dusky bars on the face, and which it is impossible to divide from *S. newarensense*. The question arises, therefore, whether we are not compelled to recognize the presence of *S. newarensense* in the Nilghiris, if not in Ceylon; for one of the specimens from Nuwara Eliya has a certain amount of barring on the face. Colonel Legge writes:—"Examples from the upper hills (whether as a rule or not, I cannot say) are darker on the disk, ruff, and lores than the low-country birds, and exhibit at the same time the facial barring which Mr. Hume found to be absent in his examination of the specimen on which he founded his Ceylonese race or subspecies *S. ochrogenys*."

With regard to Scully's *Syrnium hodgsoni*, I must say that I cannot see any character by which the species can be recognized from

S. newarense; and yet the yellow iris is an extraordinary phenomenon in a *Bulaca*, but it is confirmed by Mr. Wray's notes on the bird procured by him in the mountains of Perak.

The following is a detailed list of the specimens of *S. newarense* in the British Museum.

a. Ad. sk. Kotegurh. Hume Collection.

An adult bird, probably ♂; wing 15·6 inches. Sides of face whitish brown, barred with blackish, the edge of the ear-coverts white. Fore neck pale, with the cross bars distinct.

b. Ad. sk. Kotegurh. Hume Collection.

Supposed ♂; wing 15·0 inches. Sides of face as in preceding bird, but the fore neck much more clouded with brown, especially on the sides, which are uniform.

c. Ad. sk. Kotegurh. Hume Collection.

Supposed ♀; wing 16·6 inches. Markings as in the foregoing specimen, but all the bars rather more coarsely indicated.

d. Ad. sk. Kotegurh. Hume Collection.

Apparently a female; wing 16·6 inches. All the cross bars rather fine; the sides of the fore neck and breast also barred.

e. ♀ ad. sk. Bussahir. Hume Collection.

Wing 15·75 inches. A small bird, if correctly sexed. The under surface has a somewhat yellowish tinge, of which there is also a slight indication on the sides of the face. The sides of the fore neck tolerably uniform.

f. ♂ ad. sk. Simla, Oct. 3, 1868 (*A. O. H.*). Hume Collection.

This is the specimen described by Mr. Hume (*Rough Notes*, p. 348). Wing 15 inches. Face brown, barred with blackish, with a fringe of white towards the edge of the ear-coverts. Under surface pale. Fore neck pale, the cross bars very distinct, and the sides of the fore neck only showing uniform brown.

g. ♂ juv. sk. Simla, Oct. 5, 1868 (*A. O. H.*). Hume Collection.

Described by Mr. Hume (*t. c.*). Wing 15·6.

h. ♂ ad. sk. Nagkunda, Oct. 19, 1870. Hume Collection.

A very coarsely marked bird, and somewhat tinged with ochreous buff below. Wing 15·5 inches.

i. Ad. sk. N.W. Himalayas. Capt. Stackhouse Pinwill [*P.*].

Wing 15·8 inches. Similar to the paler Kotegurh birds. Very white underneath, with the brown bars very distinct.

k. ♀ ad. sk. Kumaon (*W. Thompson*). Hume Collection.

Wing 16·5 inches. The specimen alluded to by Mr. Hume (*Rough Notes*, p. 353). It is just like the specimen presented to the Museum by Captain Stackhouse Pinwill.

l. ♂ ad. sk. Nepal, Dec. 5, 1877 (*Dr. J. Scully*). Hume Collection.

“Wing 14·4 inches” (*J. S.*). Of general pale aspect, very distinctly barred with brown. The face is very dark and indistinctly

barred, but without any ochreous tinge. This specimen is the type of Scully's *Syrnium hodgsoni*, and had the iris "golden yellow." This accords with Mr. Wray's finding of the specimen from Perak; and the whole subject is worth inquiry from field-naturalists, for the Nepal specimen is a typical *S. newarensense* in plumage, and has no ochreous tinge on the face, whereas the Perak specimen shows a decided tendency towards *S. indrani*.

m. ♂ ad. sk. Nepal, June 19, 1877 (Dr. J. Scully). Hume Collection.

"Wing 15·7 inches in the flesh" (J. S.). Quite as dark as the preceding bird in the face, and much darker on the fore neck, which inclines to uniform brown. Were it not for the known accuracy of Dr. Scully's determinations, I should have judged this bird to be a female from its size and colour.

n. Ad. sk. Nepal. Hodgson Collection.

Wing 14 inches. Of the dark-chested kind, with a decided ochreous tinge on the face.

o. Ad. sk. Nepal. Hodgson Collection.

Wing 14·0 inches. A dark bird, with the face strongly barred and slightly tinged with ochreous. A considerable part of the fore neck uniform brown.

p. Ad. sk. Nepal. Hodgson Collection.

Wing 13·3 inches. Similarly marked to the foregoing, with a considerable amount of uniform brown on the fore neck and a decided tinge of ochreous on the face.

q. Ad. sk. Nepal. Hodgson Collection.

Wing 14·0 inches. Very pale in colour, and resembling the Kumaon bird in appearance but very much smaller.

r. Ad. sk. Nepal. Hodgson Collection.

Wing 16·0 inches. Only differs in size from the foregoing example, like which it has a generally pale tone.

s. ♂ ad. sk. Native Sikhim, Jan. 1874 (L. Mandelli). Hume Collection.

Wing 13·7 inches. Very dark in colour, strongly washed with ochre on the under surface and with rufous on the face; the eyebrow also slightly fulvescent. Across the chest is a tolerably well-defined and nearly uniform brown band.

This specimen has the appearance of being an extremely old bird, and on the crown are some curious white-tipped hairs protruding from the midst of the feathers.

t. ♀ ad. Native Sikhim, Jan. 1874 (L. Mandelli). Hume Collection.

Wing 15 inches. Chest nearly uniform. Face very dark, with a rufous tinge.

u. Ad. sk. Native Sikhim, Feb. 1875 (L. Mandelli). Hume Collection.

Wing 15·0 inches. Strongly tinged with ochreous buff, the bars

very plain, and only the sides of the chest uniform. Face extremely dark and almost uniform blackish brown, with scarcely any shade of rufous.

v. Ad. sk. Native Sikkim, Feb. 1875 Hume Collection.
(*L. Mandelli*).

Wing 15·4 inches. A very dark specimen, with the sides of the chest inclining to uniform brown and the face very dark, with no ochreous tinge.

w. Ad. sk. Native Sikkim, March 1876 Hume Collection.
(*L. Mandelli*).

Wing 14·2 inches. Rather dark brown on the chest, but not entirely uniform. On the face a strong tinge of ochreous as well as on the under surface of the body.

x, y. Ad. sk. Native Sikkim, March 1874 Hume Collection.
(*L. Mandelli*).

Wings 14·2–14·3 inches. Remarkable specimens, with a broad uniform band of dark brown across the chest. Face also dark and without ochreous tinge.

z. Ad. sk. Native Sikkim, March 1874 Hume Collection.
(*L. Mandelli*).

Wing 14·1 inches. The chest-band not so complete as in the foregoing specimens, but still nearly uniform. The face very dark but with a slight rufous tinge. This specimen also has white-tipped hairs on the crown.

a'. ♀ ad. sk. Native Sikkim, March 1876 Hume Collection.
(*L. Mandelli*).

Wing 15·4 inches. Rather a pale specimen, but with a well-formed band of light brown across the chest. Face dark, excepting the hinder fringe to the ear-coverts, which is conspicuously white.

b'. Ad. sk. Native Sikkim, April 1873 Hume Collection.
(*L. Mandelli*).

Wing 15·2 inches. In appearance this specimen almost exactly matches Mr. Wray's bird from Perak, but is a little more uniform brown on the chest. There is a distinct rufous tinge on the face.

c'. Ad. sk. Native Sikkim, April 1874. Hume Collection.

Wing 15·3 inches. Pale underneath, but with the sides of the chest nearly uniform brown; face dark, but with a slight rufescent tinge.

d'. Ad. sk. Native Sikkim, April 1874 Hume Collection.
(*L. Mandelli*).

Wing 15 inches. A dark bird with nearly uniform chest and dark face, with scarcely any ochreous tinge on the latter.

e'. Juv. sk. Native Sikkim, April 1874 Hume Collection.
(*L. Mandelli*).

f'. Juv. sk. Native Sikkim, May 1875 Hume Collection.
(*L. Mandelli*).

g'. Ad. sk. Native Sikkim, July 1874 Hume Collection.
(*L. Mandelli*).

Wing 13·9 inches. Decidedly ochreous buff underneath, with the chest narrowly barred across like the rest of the under surface. Face dark, without any ochreous tinge.

h'. Ad. sk. Native Sikkim, July 1874 Hume Collection.
(*L. Mandelli*).

Wing 15·5 inches. Chest nearly uniform brown. Face very dark, with not a tinge of ochreous.

i'. Juv. sk. Native Sikkim, July 1874 Hume Collection.
(*L. Mandelli*).

k'. Juv. sk. Native Sikkim, Aug. 1875 Hume Collection.
(*L. Mandelli*).

l'. Ad. sk. Native Sikkim, Nov. 1874 Hume Collection.
(*L. Mandelli*).

Wing 14 inches. Underneath decidedly ochreous, and having also a strong reddish tinge on the face. No tendency to uniform brown on the chest.

m'. Ad. sk. Sikkim, Dec. 1874 Hume Collection.
(*L. Mandelli*).

Wing 14·8 inches. Rather pale, with barred chest and face and no ochreous colour on the latter.

n'. Ad. sk. Sikkim, Dec. 1873 Hume Collection.
(*L. Mandelli*).

Wing 13·9 inches. Rather dark, with a strong ochreous tinge on the face and underparts, the barring being very distinct on the breast and not strongly pronounced on the face. There is a great similarity between this specimen and the Coonoor bird alluded to below, and it is even less strongly barred on the face than that specimen.

o'. ♀ ad. sk. Darjiling. Hume Collection.

Wing 15·75 inches. Very pale-coloured, quite as light as the birds from the North-west Himalayas. Face very dark, and not tinged with rufous.

p'. Ad. sk. Darjiling, Sept. 1872. Hume Collection.

Wing 14·4 inches. The palest specimen examined, the under surface quite white, with dark brown bars everywhere; the scapular markings also white and very conspicuous; the face white, with dark cross bars.

q'. ♂ ad. sk. Darjiling. Hume Collection.

Wing 14·5 inches. Entire aspect very light, with the whole of the breast barred like the abdomen; face also light and strongly barred, without any rufous tinge.

r'. Juv. sk. Darjiling (*Pearson*). India Museum.

s'. ♂ ad. sk. Shillong, Assam, Aug. 17, 1877 Hume Collection.
(*J. Cockburn*).

Wing 14 inches. Very ochreous underneath, with the sides, but

not the centre of the chest, uniform brown. Face deep ochreous, lighter towards the edge of the frill, where it becomes whitish. The face almost uniform, with scarcely any indication of cross-bars; eyebrow white. White-tipped hair-like feathers are plentiful on the head and also on the wing-coverts and sides of neck.

t. ♀ ad. sk. Shillong, Dec. 17, 1877 Hume Collection.
(*J. Cockburn*).

Wing 14·5 inches. Tinged with ochreous buff below, but not nearly so bright as in the preceding specimen. Face strongly washed with deep ochre, but distinctly barred with blackish.

u. Ad. sk. Machi, Munipur, May 7, 1881 Hume Collection.
(*A. O. H.*).

Wing 14·5 inches. Barred on the chest and distinctly tinged with ochreous below. Face deep ochreous, with very few dusky blackish bars.

v. ♀ ad. sk. South Formosa Seebohm Collection.
(*R. Swinhoe*).

Wing 15·3 inches. Fulvescent below, the cross-bars not very strongly marked, the chest being similarly barred. Face deep ochreous brown, with scarcely any indication of blackish cross-bars.

3. SYRNIUM INDRANI.

Syrnium indrani (Sykes); Sharpe, Cat. Birds, ii. p. 282 (1875); Legge, Ibis, 1874, p. 11, 1875, p. 273; Rainey, Str. F. 1875, p. 332; Butler, *t. c.* p. 439; Butler, Str. F. 1878, vol. ii. p. 94; Hume, Str. F. 1879, p. 229; Vidal, Str. F. ix. p. 35 (1880); Davison, Str. F. xi. p. 342 (1883).

The following is a list of the specimens of this species in the British Museum:—

a. ♂ ad. sk. Ootacamund, April 19, W. Davison, Esq. [P.].
1883 (*W. D.*).

Wing 12·8 inches. A pale brown bird, the chest barred like the rest of the under surface. Face uniform deep ochreous buff, with scarcely any white posterior line between the ear-coverts and the ruff.

b. ♀ ad. sk. Ootacamund, April 19, W. Davison, Esq. [P.].
1883 (*W. D.*).

Wing 13 inches. Similar to the male, but with a little fringe of white behind the ear-coverts, which are uniform ochreous buff.

c. ♀ ad. sk. Ootacamund, Jan. 20, Hume Collection.
1881 (*W. D.*).

Wing 13·1 inches. Also very pale below, the chest narrowly barred with brown like the rest of the underparts. Face uniform deep ochreous, with scarcely any indication of dusky cross-barring anywhere.

d. ♀ ad. sk. Kotagherry, Nilghiris, Feb. 28, Hume Collection.
1874 (*Miss Cockburn*).

- e. ♀ ad. sk. Coonoor, Nilghiris, Jan. 28, Hume Collection.
1881 (*W. Davison*).

Wing 13·9 inches. Very pale below, with whitish cross-bars, somewhat coalescing on the chest, which is consequently more uniform. Face deep ochre, barred across with blackish.

- f. Ad. sk. Southern India (*Dr. Jerdon*). J. Gould, Esq.

Wing 13·6 inches. Very tawny in appearance, the face being deep ochreous buff, rufous near the eye, with scarcely any sign of white on the frill of the ear-coverts.

- g. Ad. sk. Nuwara Eliya, Ceylon. Mr. E. Boate [C.].

Wing 13·2 inches. A dark bird, with the chest barred like the rest of the under surface; face deep ochreous buff, with evident traces of dusky cross bars.

- h. Ad. sk. Nuwara Eliya, Ceylon. Mr. E. Boate [C.].

Wing 12·5 inches. A darker bird, with the chest coarsely barred with dark brown, somewhat uniform on the sides. Face uniform deep rufous ochre, with a slight indication of white on the lower part near the frill.

- i. Ad. sk. Kandy (*A. White*). Hume Collection.

Wing 11·9 inches. Strongly tinged with ochreous below. Face bright orange-rufous, with scarcely any white on the lower margin. No sign of cross-barring on the face.

2. On the Presence of a Canal-System, evidently Sensory, in the Shields of Pteraspidian Fishes. By A. SMITH WOODWARD, F.Z.S., F.G.S., of the British Museum (Natural History).

[Received April 28, 1887.]

In his well-known monograph on the Cephalaspidæ, Professor Ray Lankester described and figured¹ a number of small depressions or "pits," arranged in double series upon the external surface of certain head-shields pertaining to the Heterostracous or Pteraspidian division of the group; and three years subsequently, in making known a new generic type, *Holaspis*², he remarked still further upon the same curious pittings, which were shown in this fossil with unusual distinctness. These he naturally regarded as "the sites of soft tegumentary structures, in all probability of those characteristic sensory-follicles of fishes," with which they agreed in disposition; and then followed another inference, "that a secreting membrane was closely attached to the striated calcareous material" of the outer layer of the shield in the original living fish.

Some of these fossils are now in the British Museum, the fine

¹ E. Ray Lankester, "The Cephalaspidæ" (Mon. Palæont. Soc., 1868, 1870), pp. 17, 22, pl. i. figs. 1, 4, 8; pl. vi. figs. 1, 6; pl. vii. figs. 8, 9.

² E. Ray Lankester, "On *Holaspis sericeus*," Geol. Mag. vol. x. (1873), pp. 241-245, pl. x.